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School Finance Reform and School Quality: Lessons from Vermont

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Abstract: In June of 1997, the elected leaders of Vermont enacted the Equal Educational Opportunity Act (Act 60) in response to a state supreme court decision in *Brigham v. State*. Act 60 could provide a unique opportunity to determine if dramatic school finance reforms like those enacted in Vermont generate greater equality in measured student performance. This paper represents an attempt to document the changes in the distributions of spending and of student performance that have occurred in the post-Act 60 period. This paper begins with an overview of the institutional structure of educational finance and provision in Vermont. One purpose of this overview is to make the argument that the Vermont case is particularly interesting because there have not been dramatic demographics changes that could obscure the impact of finance reforms. With this context established, I then use a panel of Vermont school districts that spans the pre- and post-Act 60 period to examine the extent to which there has been convergence across school districts in per pupil expenditures and in student performance. Spending has clearly converged; a definitive answer on the extent of convergence in student performance must wait until more years of data are available.

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1. Introduction

In June of 1997, the elected leaders of Vermont enacted the Equal Educational Opportunity Act (Act 60) in response to a state supreme court decision in the *Brigham v. State* case. Act 60 may well have represented the most radical reform of a state's system of public school financing since the post-*Serrano*, post-Proposition 13 changes in California in the late 1970s. As a result, Act 60 could provide a unique opportunity to determine if dramatic school finance reforms like those enacted in Vermont generate greater equality in measured student performance. This paper represents an attempt to document the changes in the distributions of spending and of student performance that have occurred in the post-Act 60 period.

This paper begins with an overview of the institutional structure of educational finance and provision in Vermont. One purpose of this overview is to make the argument that the Vermont case is particularly interesting because there have not been dramatic demographic changes that could obscure the impact of finance reforms. With this context established, I review the research on the links between finance reforms and the distributions of education spending and of student performance. After briefly discussing the data utilized, I examine the extent to which there has been convergence across school districts in expenditures and in student performance.

All of the available data support the conclusion that the link between spending and taxable resources has been significantly weakened and that spending, however it is measured, is substantially more equal. I also present evidence that the cross-district dispersion of performance of 4th graders on standardized test of mathematics has declined post-Act 60. And there is no evidence of increased cross-district dispersion of the test performances of 2nd and 8th graders.

2. School Finance Reform in Vermont

In 1995 in Lamoille Superior Court, a group of plaintiffs which included Amanda Brigham, a nine-year old student in the Whiting School District (Burkett, 1998), filed suit against the State of Vermont. The goal of the suit was to force substantive reform of a system of school financing that the plaintiffs felt deprived students in property-poor school districts of equal educational opportunities and forced taxpayers in these property-poor districts to assume a disproportionate burden of the financing of public education. On February 5, 1997, the Supreme Court of the State of Vermont ruled in favor of the plaintiffs, concluding that the existing system deprived "children of an equal educational opportunity in violation of the Vermont Constitution" (*Brigham v. State* (96-502); 166 Vt. 246). The court left it to the legislature to craft a new financing system that was consistent with the state constitution.

The focus in the plaintiffs's suit on both inequalities in educational spending and disparities in property tax burdens grew out of long-standing dissatisfaction in Vermont with the existing foundation system of education financing and the existing system of property taxation. Prior to Act 60, Vermont used a traditional foundation formula to determine the state aid a town received:

(1) Total state aid = (Weighted ADM)*(Foundation amount) - (Foundation tax rate)*(Aggregate fair market value)*0.01 ,

where the weighted ADM was determined by assigning weights of 1.25 to secondary students and to students receiving food stamps and weights of between 1.0385 and 1.0714 to students who must be transported to school and by averaging the weighted counts from the previous two school years (Mathis, 1995). While the foundation amount was set with the intent of permitting districts spending that amount to meet state standards for those students assigned a

weight of 1, fluctuations in the state's fiscal status led the state legislature to adjust the foundation tax rate so as to reduce the state's aid liability. As a result, the state share of basic educational expenditures fluctuated between 0.20 and 0.37, with the share declining when the state economy weakened (Mathis, 2001). The period leading up to Act 60 was a period of decline in the state share.

The widespread dissatisfaction with the existing school financing system had not been ignored by elected officials. In both 1994 and 1995, the state house of the Vermont Legislature approved legislation designed to overhaul education financing. While this legislation failed to pass the state senate, the legislation contained key elements of the eventual response to the *Brigham* decision (McClaughry, 2001).

The legislation, by highlighting concerns about education financing and property taxation, also influenced the dynamics of the 1996 election. The state senate that was elected in 1996 was committed to property tax reform (Mathis, 2001). The result was a state legislature that was ready to move on legislation that would comply with the *Brigham* decision and reduce the property tax burdens of poor individuals.

Given the political dynamic in Vermont, the speed with which Act 60, the legislation designed to comply with *Brigham* and to provide property tax relief, was passed surprised no one. Signed into law on June 26, 1997, Act 60 created a system of school financing that combined elements of foundation and power equalization plans. A statewide property tax was established, with revenues from the tax being used to finance a portion of foundation aid.[1] If in a locality property tax revenues generated by levying the statewide rate exceed the amount

[1]In the 2000-2001 school year, the nominal property tax rate was 1.1 percent, and the foundation level was $5200.

needed to finance the foundation level of spending, the excess property tax revenues are recaptured by the state.

Under Act 60, localities are allowed to choose spending levels in excess of the foundation level. To weaken the link between property wealth and spending in excess of the foundation level, the act established a power equalization scheme that insured that localities with the same nominal tax rates would have the same levels of education spending. The power equalization scheme also included a unique recapture element; all spending in excess of the foundation level is drawn from a sharing pool that consists of all the property tax revenues generated by property tax rates in excess of the statewide rate. As a result, no revenues from statewide taxes are used to finance the power equalizing portion of the school finance system. Further, when the voters in a locality choose a nominal property tax rate above the statewide rate, the revenues that will be available for that locality's schools will not be known with certainty until all other localities have made their taxing decisions and the size of the sharing pool is established.

While the *Brigham* decision forced state policy makers to implement finance reforms, the reality was that Act 60 was as much about property tax relief as it was about school finance reform. For taxpayers in many communities, the finance reforms by themselves would have dramatically reduced tax burdens by allowing localities to maintain or even increase education spending with substantially lower tax rates. At the same time, taxpayers in high-wealth communities, which have been labeled "gold towns," necessarily faced increases in their property tax payments.[2] To lessen the burden on low-income residents of the "gold

[2]In the 1994-95 school year, 69 of the 248 towns in Vermont for which data were available had effective education property tax rates below $1.10 per $100 in assessed value. While the percentage of towns with effective education rates below $1.10 had undoubtedly declined by the 1997-98 school year, the last year before the phasing in of Act 60 began, the reality was still that Act 60 forced a sizeable fraction of the towns in Vermont to increase

towns," the drafters of Act 60 included in the legislation a provision that granted tax adjustments to certain homestead owners. These tax adjustments were explicitly linked to the taxpayer's income; the original legislation specified that all owners with incomes at or below $75,000 were eligible for adjustments.

All of these changes in the property tax were clearly designed to shift some of the burden of financing Vermont's schools away from state residents to corporations and nonresident owners of property in Vermont.[3] Thus, Act 60 continues the recent tradition of linking school finance reforms and tax relief that is exemplified by Michigan. For this reason, any complete evaluation of the success of Act 60 must consider both the changes in education provision and the changes in tax burdens. Therefore, this paper necessarily provides a partial view of the welfare implications of Act 60.[4]

The school finance reforms that were the central element of Act 60 were phased in over several years, with the new regime not fully in place until the 2000-2001 academic year. Nevertheless, as was true in California in the aftermath of *Serrano* and Proposition 13, in some districts there were surprisingly rapid responses to Act 60. Not surprisingly, in the gold towns there was vocal opposition to Act 60. Also unsurprising, given the California experience, were the efforts in these towns to encourage residents to make voluntary

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property tax rates.

[3]The correlation between each town's effective education property tax rate in 1994-95 and the fraction of that town's property that was owned by town residents in 1998-99 was 0.5461. In other words, towns with low effective property tax rates prior to Act 60 also tended to be towns in which a large fraction of the property tax burden was exported.

[4]See Heaps and Woolf (2000) and Jimerson (2001) for efforts to evaluate both the implications of Act 60 for educational provision and the effects of Act 60 on property tax burdens.

contributions to the schools[5] and to shift to town governments responsibility for financing certain "school" functions. Another California parallel is the apparent growth in private school enrollments that have been mentioned in press reports.

Care needs to be taken, however, to avoid making too much of the California parallels. Act 60 gave Vermont school districts much more discretion over the level of expenditures than California districts have. The tax price of education spending has increased in the gold towns, but spending is not being forcibly leveled-down as it was in California. Also, low wealth towns were not required to maintain local effort; several towns used the Act 60 windfall primarily to reduce nominal property tax rates. As a result, low wealth towns were not necessarily leveled-up. The reality is that Act 60 did not duplicate the California reforms; a fact on which the next section expands.

Act 60 did not duplicate the California reforms in one other important way. The California reforms pre-dated the nationwide push for accountability; Act 60 was passed at a time when most states were attempting to strengthen accountability and educational standards. As a result, several elements of the legislation built on the existing system of testing and standards to strengthen accountability. For example, under Act 60 all districts were required to develop action plans to improve student performance on the tests that are part Vermont Comprehensive Assessment System. In addition, the State Board of Education was mandated to take on a more active oversight role. Nevertheless, the central elements of the state's accountability system were unaffected by Act 60.

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[5]Since towns that collected sufficient funds from individual contributions could avoid participating in the sharing pool, in most gold towns education funds were established and property owners were encouraged to contribute to these funds. Participation rates varied across towns, ranging up to 87 percent in Manchester, where aggressive tactics, such as publication of the names of non-participants, were used to encourage giving. More traditional incentives were also used to encourage giving; in fiscal years 1999, 2000, and 2001, the Freeman Foundation matched individual donations to the funds.

3. Why Study Vermont? - A Review of Research on the Impact School Finance Reforms

The school finance reforms implemented in California in the aftermath of that state's supreme court decision in the *Serrano v. Priest* case and of the nearly contemporaneous tax limits imposed by Proposition 13 represent a watershed both in the debate over the structure of school finance reforms and in the direction of research into the impact of those reforms. In the post-*Serrano* period the California reforms and their supposed effects on the schools in that state have been discussed in every state in which school finance reforms have been implemented. Vermont is no exception; the supposed parallels between the California reforms and Act 60 have been mentioned repeatedly.[6]

The California reforms also shifted the focus of research on the impact of school finance. Prior to the reforms, the focus in the literature was almost solely on the impact of finance reforms on spending inequality. After *Serrano*, the scope of the analysis broadened to include the impact of finance reforms on the level and distribution of student achievement, on housing prices, on the supply of private schooling, and even on the composition of affected communities.[7] The California reforms also became the touchstone for theoretical work. Papers like those of Nechyba (1996, 2000), Bénabou (1996), and Fernandez and Rogerson (1997, 1998) used a California-like system as the post-reform case when trying to reach predictions about the likely effects of finance reform.

The problem with using the California case as a benchmark is that the case has proven to be the exception, not the rule. First, the limits imposed on local control over spending have not been duplicated in any other state. Even in Michigan and Vermont, the states in

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[6]For examples of references to California, see McClaughry (1997) and Mathis (1998).

[7]The number of papers dealing with these varied topics are too numerous too cite. Evans, Murray, and Schwab (1999) and Downes and Figlio (1999, 2000) cite many of the relevant papers.

which the most extensive post-*Serrano* reforms have been implemented, some degree of local control over taxes and spending is permitted. Further, the population of students served by California schools changed more dramatically than the population of students in any other state in the nation. From 1986 to 1997, the percent of the California public school student population identified as minority increased from 46.3% to 61.2%. Nationally, the percent minority grew far more slowly, from 29.6% to 36.5%.[8] As Downes (1992) notes, these demographic changes make it difficult to quantify the impact of the finance reforms in California on the cross-district inequality in student achievement.

The possibility that California might be the exception and not the rule pushed a number of researchers to pursue national-level studies attempting to document the impact of finance reforms. On the spending side, Silva and Sonstelie (1995), Downes and Shah (1995), and Manwaring and Sheffrin (1997) all took slightly different approaches to quantifying the effect of finance reforms on mean per pupil spending in a state. Because they used district-level data, Hoxby (2001), Evans, Murray, and Schwab (1997), and Murray, Evans, and Schwab (1998) were able to consider not only the effects of finance reforms on mean spending but also the extent to which spending inequities were reduced by those reforms. As a result, these studies provide the most obvious sources for predictions of the long run effects of Act 60. The problem is that these studies generate contradictory predictions. Hoxby's results would lead us to expect leveling down, since Act 60 dramatically increases tax prices

[8]Generating comparable numbers for earlier years is difficult. Nevertheless, the best available data support the conclusion that these sharp differences in trends in the minority share pre-date the *Serrano*-inspired reforms. For example, calculations based on published information for California indicate the percent minority in 1977-78 was approximately 36.6%. Nationally, estimates based on the October 1977 Current Population Survey indicate the percent minority was 23.9%.

in towns with more property wealth. Murray, Evans, and Schwab conclude that court-mandated reforms like Act 60 typically result in leveling up.

The same lack of a clear prediction would be apparent to the reader of national-level attempts to determine how the distribution of student performance in a state is affected by a finance reform. Hoxby (2001) represents the first attempt to use national-level data to examine the effects of finance reforms on student performance. She finds that dropout rates increase about eight percent, on average, in states that adopt state-level financing of the public schools. Although Hoxby's work does not explicitly address the effect of equalization on the within-state distribution of student performance, it seems likely that much of the growth in dropout rates occurred in those districts with relatively high dropout rates prior to equalization. In other words, these results imply that equalization could adversely affect both the level and the distribution of student performance.

While the dropout rate is an outcome measure of considerable interest, analyses of the quality of public education in the U.S. tend to focus on standardized test scores and other measures of student performance that provide some indication of how the general student population is faring. Husted and Kenny (2000) suggest that equalization may detrimentally affect student achievement. Using data on 34 states from 1976-77 to 1992-93, they find that the mean SAT score is higher for those states with greater intra-state spending variation. However, the period for which they have test score information, 1987-88 to 1992-93, post-dates the imposition of the first wave of finance reforms. Thus, the data do not permit direct examination of the effects of policy changes. In addition, because they use state-level data, Husted and Kenny cannot examine the degree to which equalization affects cross-district

variation in test scores.[9] Finally, since only a select group of students take the SAT, Husted and Kenny are not able to consider how equalization affects the performance of all students in a state.

Card and Payne (2002) explore the effects of school finance equalizations on the within-state distributions of SAT scores. They characterize a school finance policy as more equalizing the more negative is the within-state relationship between state aid to a school district and school district income. They find that the SAT scores of students with poorly-educated parents (their proxy for low income) increase in states that, under their definition, become more equalized. Data limitations, however, make it impossible for Card and Payne to examine the effects of policy changes on students residing in school districts in which the changes had the greatest impact. Moreover, while Card and Payne correct for differences in the fractions of the population taking the SAT test, it is still very likely that the students who come from low-education backgrounds but take the SAT test are a very select group and are extremely unlikely to be representative of the low-income or low-education population as a whole.[10]

Downes and Figlio (2000) attempt to determine how the tax limits and finance reforms of the late 1970s and early 1980s affected the distribution of student performance in states in which limits were imposed and how student performance has changed in these states relative

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[9]Husted and Kenny do find evidence consistent with the conclusion that, in state's in which school finance reforms, these reforms have no impact on the standard deviation of SAT scores. Since, however, the standard deviation of test scores could be unchanged even if cross-district inequality in performance had declined, this evidence fails to establish that finance reforms do not reduce cross-district performance inequality.

[10]For instance, among the students in Card and Payne's low-parental-education group, in 28 states in 1978 (25 states in 1990) fewer than ten percent took the SAT examination and in 20 states in 1978 (15 states in 1990) fewer than three percent took the SAT. Further, in 1978 no state had more than 36.2 percent of the low-parental-education group take the SAT.

to student performance in states in which no limits or no finance reforms were imposed. The core data used in the analysis were drawn from two national data sets, the National Longitudinal Study of the High School Class of 1972 (NLS-72) and the 1992 (senior year) wave of the NELS. The NELS data were collected sufficiently far from the passage of most finance reforms to permit quantification of the long-run effects of these reforms by analyzing changes in the distributions of student performance between the NLS-72 cross-section and the NELS cross-section.

Downes and Figlio find that finance reforms in response to court-decisions, like that in the *Brigham* case, result in small and frequently insignificant increases in the mean level of student performance on standardized tests of reading and mathematics. Further, they note that there is some indication that the post-reform distribution of scores in mathematics may be less equal. This latter result highlights one of the central points of the paper; any evaluation of finance reforms must control for the initial circumstances of affected districts. The simple reality is that finance reforms are likely to have differential effects in initially high spending and initially low spending districts.

The fundamental reason for the absence of clear predictions of the impact of finance reforms has been mentioned by a number of authors (e.g., Downes and Shah (1995), Hoxby (2001), Evans, Murray, and Schwab (1997)), all of whom have emphasized the tremendous diversity of school finance reforms. In a national-level study, any attempt to classify finance reforms will be imperfect. So, even though there is general consensus that the key elements of a finance reform are the effects of the reform on local discretion, the effects of the reform on local incentives, and the change in state-level responsibilities in the aftermath of reform (Hoxby (2001), Courant and Loeb (1997)), different authors take different approaches to account for the heterogeneity of the reforms. The result is variation in predictions generated

by studies that are asking the same fundamental question. The answer, it seems, is not to try and improve the methods of classifying reforms but is, instead, to carefully analyze certain canonical reforms. Act 60 is likely to be just such a canonical reform.

In looking for guidance for an analysis of the Vermont reforms, the first case to consider is that of Kentucky, where the reforms that followed a court decision invalidating the system of school finance may represent the most radical change to a state's system of public schooling provision. Flanagan and Murray (2002) document the effects of the reforms in Kentucky. Unfortunately, because the reforms in Kentucky were so extensive, any lessons from that case are probably not particularly relevant for those attempting to predict the effect of reforms that, like Act 60, primarily affect the system of school finance.

Thus, the most direct antecedent in this case-study approach to analyzing finance reforms is Downes (1992), who showed that the extensive school finance reforms in California in the late 1970s generated greater equality across school districts in per pupil spending but not greater equality in measured student performance. Duncombe and Johnston's (2002) work on Kansas offers an example of a recent case study of a canonical reforms. This study of Vermont is another such example. Will the outcomes in Vermont duplicate those in California? What are the similarities in and differences between the results for Vermont, Kansas, and Kentucky? The data used to answer these questions are described in the next section.

4. Data

4.1 Sources

The majority of the data that are analyzed in this paper are drawn from the Vermont School Report and from publications of the Vermont Department of Taxes. In addition, town level data on school expenditures were drawn from Heaps and Woolf (2000) and from files

created by the Vermont Department of Education and posted at http://www.state.vt.us/educ/schfin/class/dist_class.html. The Vermont Indicators Online database, that is maintained by the Center for Rural Studies at the University of Vermont, was the source some pre-1999 information on income, demographics, and property wealth at the town level. Finally, the Common Core of Data that is maintained by the National Center for Education Statistics was the source of school-level data on the racial/ethnic composition of the each school's student body.

The norm in Vermont is that towns and school districts are coterminous. There are, however, numerous deviations from the norm. Some small towns do not operate elementary or secondary schools; the children from these towns are sent to public or even private schools in neighboring communities, with tuition payments going from the sending towns to the receiving schools.[11] Many other towns do not have their own high schools, choosing to either "tuition-out" their high school children or to participate in unit high school districts.[12] Since one of the goals of this research was to quantify the impact of Act 60 on the inequality in services provided to the school children of Vermont, the school district had to be the fundamental unit of analysis. Thus, several decisions had to be made to ensure that what was presented was the most accurate picture of the impact of Act 60 on the distributions of expenditures and student performance. First, all towns that were not tuitioning-out students at the elementary level were matched to the school district serving elementary school students

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[11]In the 2001-2002 school year, 824 equalized pupils (out of 103,347 equalized pupils in the state) resided in towns or other areas in which all students were tuitioned out. Another 87 equalized pupils resided in towns that did not operate an elementary school but belonged to a union high school district.

[12]In the 2001-2002 school year, 15,274 equalized pupils resided in towns in which elementary students were served locally but high school students were tuitioned out. Of these 15,274 equalized pupils less than half were tuitioned out.

from that town. The same matching process was done for towns not tuitioning out high school students.[13] Knowing the town-school district matches made it possible to create school district level versions of some variables that were only available at the town level. Second, towns were grouped into types based on institutional arrangements. This made it possible to examine separately the impact of Act 60 on school districts linked to towns with different institutional arrangements.

Nevertheless, the reality in Vermont is that school spending levels are voted on in town meeting, that state aid flows to towns and not school districts, and that analyses of the impact of Act 60 have tended to focus on variation across towns in expenditures. So, even though cross-town variation provides an imperfect indication of the variation across school districts (and, thus, across students) in expenditures, results are presented that use town-level data on expenditures. These results make it possible to compare the findings in this study to those in previous work. Further, the town-level data are such that it is possible to make a crude adjustment for the effect of institutional variation on expenditures. In particular, the analysis in this paper will use two alternative measures of expenditures, one of which is explicitly designed to adjust for variation in institutional structure.

4.2 Summary statistics

One of the advantages of examining the impact of finance reforms in Vermont is the stability of the student population served by Vermont schools. For example, in the 1995-96 school year 3.12% of the students attending public school in Vermont were identified as minority. This percentage fluctuated slightly over the next four academic years, from 2.73%

[13]If a town tuitions out either elementary or high school students, those students could be attending school in several surrounding districts. As a result, the town cannot be matched to a single elementary or high school district.

in 1996-97 to 3.16% in 1999-2000.[14] Clearly, in Vermont, unlike in California, the schools were not trying to adjust to a dramatically changing population at the same time they were coping with the effects of finance reforms.

Other measures of the income and demographics of the Vermont student population were also relatively stable both immediately before and just after the implementation of Act 60. For each school year from 1994-95 to 2000-2001, Table 1 provides summary statistics on certain key measures of the demographics and income of each school district in the state. Average adjusted gross income per exemption, a rough proxy for per capita income, did increase throughout the period, an unsurprising result given that all dollar figures in the table are nominal and that this was a period of strong economic expansion. What is more striking, however, is the stability across time of the poverty rate and the percent of students eligible for free or reduced-price school lunches. The observable characteristics of the population of students being served by Vermont schools appear to have changed little over time.

This stability of measured attributes of the student population does not insure that there have been no significant changes in critical unmeasured characteristics of the students served by the public schools in Vermont. In other words, in an event analysis of the impact of Act 60 on the distribution of student performance, there will be no way to rule out the possibility that cross-time changes in the distribution are driven by cross-time changes in unobservables as opposed to by the effects of the finance reforms. That said, the Vermont context still provides researchers with the best opportunity to date to estimate the effects of finance reforms on the distribution of student performance.

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[14]Means across schools of the percent minority evidence the same stability. In 1995-96, the across-school mean was 2.1%. In 1999-2000, the across-school mean was 2.8%.

The remaining rows in Table 1 provide summary information on some of the expenditure and student performance measures available in the Vermont School Report. No obvious trends in performance are apparent in Table 1. Some performance measures improved after Act 60; others declined. For some of the measures of performance, dispersion fell after Act 60, but dispersion increased for other measures. However, because the crude summary measures in Table 1 give no indication of how post-Act 60 changes are linked to a district's pre-Act 60 status, no conclusions about the performance effects of Act 60 can be drawn on the basis of the evidence in Table 1.

Table 1 also does not support any firm conclusions about the extent to which the link between local wealth and spending has been weakened by Act 60. That said, even the summary measures in Table 1 provide some indication of the impact of Act 60 on the dispersion in expenditures. The coefficient of variation of current expenditures per pupil increased from 3.61 in 1994-95 to 5.71 in 1999-2000. While some of this increase pre-dated Act 60, Act 60 has mattered, a fact that should be more evident when post-phase in expenditure measures are analyzed. It is to these measures that we turn in the next section.

5. Results

5.1 The Distribution of Expenditures Before and After Act 60

The starting point of any evaluation of the effects of Act 60 is the choice of a measure of per pupil expenditures. When towns have been used as the unit of analysis, two measures of spending have been used in analyses of the extent of spending inequality and the effect of Act 60 on that inequality. Heaps and Woolf (2000) used budgeted expenditures per equalized pupil. However, because many towns send or receive students for whom tuition is being paid, inequality in budgeted expenditures may overstate true spending inequality. For example, overstatement of inequality could result because budgeted expenditures per equalized

pupil are based on residential pupil counts that do not include tuitioning students, resulting in artificially high per pupil numbers for districts receiving tuition students. So, as an alternative, other analysts, like Jimerson (2001) and Baker (2001), use measures of spending based on the state's calculation of local education spending per equalized pupil. Local education spending is that portion of a school district budget paid by the general state support grant, local education tax revenues, and any aid from the sharing pool when applicable. Local education spending does not include federal aid or privately donated dollars.

In what follows, both measures of spending are considered since neither is a perfect indicator of the educational opportunities available to students in a town. The argument for using budgeted expenditures is that this measure includes expenditures out of not only noncategorical state aid and property tax income but also expenditures out of such diverse income sources as categorical aid for special education[15] and income from the private donations to the schools. But, because of the problems created by students for whom tuition payments are being made, local education spending per pupil must also be considered.

At the school district level, the choice of expenditure measures is some what more clear cut. Current expenditures per pupil measures non-capital spending; total expenditures per pupil includes current and capital spending. In the analysis that follows, both of these measures are examined. It is not possible, however, to examine the extent to which cost-adjusted spending has become more equal. Both before and after Act 60, the state aid formula recognized the fact that certain students are more costly to educate, basing aid amounts not on raw pupil counts but on equalized pupil counts. The equalized pupil count was determined by assigning weights of 1.25 to secondary students and to students receiving

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[15]Since categorical aid is fungible, increases in categorical aid do increase the opportunities even for those students toward whom the aid is not targeted.

food stamps and weights of 1.2 to students with limited English proficiency and by averaging the weighted counts across two school years (Mathis, 2001). Since these weights are ad hoc and other critical determinants of cost are not taken into account, the cost adjustments in the basic state aid formula will be imperfect (Downes and Pogue, 1994). Categorical aid programs, like a small schools grant program that was established by Act 60, may help to reduce inequality in cost-adjusted aid. Nevertheless, any inequality measures presented below undoubtedly understate the extent of inequality in cost-adjusted spending, since high-cost districts are typically low-spending districts.

While the circumstances cited by the plaintiffs in *Brigham v. State* existed for many years, trends in spending inequality in the late 1980s and early 1990s undoubtedly contributed to the decision to file suit. For example, from 1989-90 to 1994-95, current expenditures per pupil had grown at an annual rate of 3.77% at the top of the range. The annual growth rate at the bottom of the range was only 1.9%. The *Brigham* decision was handed down when the dispersion in expenditures was large and growing.

Standard inequality measures like the coefficient of variation and the Gini coefficient can both reflect the tail end of these trends and can provide an initial indication of the impact of Act 60 on spending inequality. And, when the town level measures of spending are used, the initial indication is that spending has become more equal post-Act 60. In particular, for budgeted expenditures in 1998-99, the coefficient of variation was 0.1508 and the Gini coefficient was 0.0851. In 2000-2001, the coefficient of variation was 0.1305 and the Gini coefficient was 0.0731. These measures of inequality increased slightly from 2000-2001 to 2001-2002, to 0.1360 for the coefficient of variation and 0.0758 for the Gini coefficient, but both measures were still below there 1998-99 levels. And, since Act 60 was already being

phased-in in 1998-99, these numbers probably understate the extent to which inequality in education spending by towns has declined after the implementation of Act 60.

Inequality measures at the school district level tell much the same story as town level inequality measures. For example, for those school districts serving students in grades K-12, the coefficient of variation of current expenditures per pupil was 0.1482 in 1995-96. For these districts, the coefficient of variation fell to 0.1412 in 1996-97 but increased to 0.1488 in 1997-98, the last pre-Act 60 year. In the post-Act 60 period, the coefficient of variation for current expenditures per pupil in these school districts has consistently declined, falling to 0.1425 in 1998-99, to 0.1386 in 1999-2000, and to 0.1251 in 2000-2001.[16]

For other types of school districts, the inequality measures tend to tell the same story- fluctuating inequality pre-Act 60 and declining inequality post-Act 60. The one exception occurs for those elementary school districts located in towns that belong to union or joint high school districts.[17] For these districts, the coefficients of variation in current expenditures per pupil were 0.2760 in 1995-96, 0.1706 in 1996-97, 0.1837 in 1997-98, 0.1929 in 1998-99, 0.1889 in 1999-2000, and 0.2119 in 2000-2001.[18] Whether this increase in inequality in spending in 2000-2001 was an anomaly or a reflection of an increased ability of districts to circumvent Act 60 can only be determined as more years of data become available.

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[16]The pattern of Gini coefficients for current expenditures per pupil in these districts is very similar. The values of the Gini coefficients were 0.0801 in 1995-96, 0.0776 in 1996-97, 0.0835 in 1997-98, 0.0796 in 1998-99, 0.0776 in 1999-2000, and 0.0690 in 2000-2001.

[17]In addition to K-12 districts and elementary districts located in towns that belong to union or joint high school districts, the other large group of districts is elementary districts located in towns that tuition-out their high school students.

[18]Again, the pattern of Gini coefficients for current expenditures per pupil in these districts is very similar. The values of the Gini coefficients were 0.1177 in 1995-96, 0.0955 in 1996-97, 0.1015 in 1997-98, 0.1044 in 1998-99, 0.1013 in 1999-2000, and 0.1107 in 2000-2001.

Even if this increase in inequality in elementary school districts located in towns that belong to union or joint high school districts is not an anomaly, dispersion of expenditures does not imply unequal opportunities attributable to differences in taxable wealth, a reality that was recognized by the Vermont Supreme Court. For instance, dispersion in current expenditures per pupil could exist and be unrelated to property wealth if the state targeted categorical aid to districts with a greater proportion of disadvantaged students. What equalization of educational opportunities does require is elimination of the positive correlation between expenditures and taxable wealth. That this is the case is made clear in the *Brigham* decision

> Equal educational opportunity cannot be achieved when property-rich school districts may tax low and property-poor districts must tax high to achieve even minimum standards. Children who live in property-poor districts and children who live in property-rich districts should be afforded a substantially equal opportunity to have access to similar educational revenues. (page 23, *Brigham v. State* (96-502); 166 Vt. 246)

Simple inequality measures do not tell us the extent to which Act 60 has produced a system of school financing in which the correlation between spending and wealth has been reduced. Thus, following the logic of Downes (1992), simple ordinary least squares regressions of the spending measures on measures of local resources were used to determine the extent to which Act 60 has reduced this correlation. For towns, the results of these regressions are presented in Tables 3A and 3B.

For the 246 towns in Vermont for which the relevant data are available, the first part of Table 3A indicates the correlation between budgeted expenditures per equalized pupil and

equalized assessed valuation per pupil[19] was .516,[20] clear evidence districts with more real property wealth did have higher per pupil expenditures prior to Act 60. Since Act 60 was already being phased-in in 1998-99, this correlation probably understates the actual strength of the relationship between expenditures and property wealth prior to the *Brigham* decision.

The remainder of the first column of Table 3A show that, while the extent of inequality in educational opportunities varies across potential measures of taxable resources, the conclusion that opportunities were unequal does not depend on the measure of taxable resources used. For example, if permanent income is taken as the measure of taxable resources and median family income is used to proxy for permanent income, the correlation between budgeted expenditures per equalized pupil and taxable resources is .295, much less than the correlation between budgeted expenditures and equalized assessed valuation but still strong.

As the discussion of Table 1 indicated, after Act 60 dispersion in expenditures was reduced, even in the phase-in years. Nevertheless, dispersion remained. But the *Brigham* decision did not require equalization of expenditures; the decision required the ability to fund public education be independent of (or negatively correlated with) taxable wealth. The second column of Table 3A and both columns of Table 3B provide the evidence needed to determine if Act 60 has resulted in an education financing system that satisfies the *Brigham*

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[19]Because of data limitations, equalized assessed valuation can only be calculated for 1998-99. The 1998-99 values are used throughout this analysis. While pre-Act 60 measures of property wealth would probably be preferable, Act 60-induced changes in property values were unlikely to be apparent in 1998-99, the first year of the phase-in of Act 60.

[20]It is not possible to separate capital expenditures out of this measure of per pupil expenditures. No clear indication exists as to whether the correlation of this expenditure measure with assessed valuation overstates or understates the correlation of current expenditures with assessed valuation. Thus, some caution must be exercised in interpreting these correlations.

decision. From 1998-99 to 2001-2002, the correlation between equalized assessed valuation per pupil and budgeted expenditures per equalized pupil fell from .516 to .104 and, in the latter year, was barely significant at the 10 percent level. Similar weakening in the relationship between this expenditure measure and other measures of taxable resources can be seen in Table 3A. Further, in Table 3B, which gives only post-Act 60 correlations between taxable resource measures and local expenditures per equalized pupil, the estimated relationship between equalized assessed valuation per pupil and local expenditures per equalized pupil is actually negative. Median family income continues to be positively related to local expenditures per equalized pupil, though this relationship does appear to be weakening over time.

In combination with the evidence on the simple distributions of expenditures, these results support the view that a good faith effort has been made to satisfy the *Brigham* decision. While the correlation between the two expenditure measures considered here and taxable resources has not been reduced to zero, educational opportunities were more equal in 2001-2002 than in 1998-99.[21]

When we turn to school districts as the unit of analysis, the results do not provide quite as unequivocal picture of the impact of Act 60 on the correlation between wealth measures and per pupil spending. In Tables 4A and 4B, the results of regressions like those that generated the results in Tables 3A and 3B are reported for the case when K-12 districts

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[21]Given the available data, it was not possible to quantify directly the strength of the correlation between expenditures and wealth measures prior to implementation of Act 60. However, the results of Baker (2001) provide an indirect indication of the strength of the correlation. In regressions that are analogous to those in part 3 of Table 3B, Baker generates R^2s ranging from 0.47 to 0.51 for the school years from 1994-95 to 1998-99. Further, the highest R^2 occurs in 1998-99, the first year of the Act 60 phase-in. The implication, then, is that the correlation between expenditures and the wealth measures considered in this paper was probably strong and stable in the years leading up to Act 60.

are the unit of analysis. In Tables 5A and 5B, elementary school districts located in towns that belong to union or joint high school districts are the unit of analysis.[22]

When current expenditures per pupil is used as the spending measure, the correlations between spending and wealth decline for each wealth measure and both for K-12 districts and for elementary school districts located in towns that belong to union or joint high school districts. If, however, total expenditures per pupil is used as the spending measure, there is not consistent evidence of a weakening in the relationship between spending and wealth. Only when K-12 districts are the unit of analysis and equalized assessed value per pupil is the wealth measure has the correlation declined, from 0.184 in 1997-98 to 0.176 in 1998-99. For the other wealth measures, the correlation between total expenditures per pupil and wealth has increased for the K-12 districts. And for each of the three wealth measures, the correlation between total expenditures per pupil and wealth has increased for elementary school districts located in towns that belong to union or joint high school districts. Explaining this strengthening of the correlation between total expenditures per pupil and wealth will be a task for future work. But, what is apparent now is that this correlation will be made stronger by recent legislation that excludes from the sharing pool property tax revenues that are raised to fund capital improvements.

5.2 Student Performance Before and After Act 60

As the discussion in Section 2 indicates, the *Brigham* decision focused on spending inequities. Further, the goals of Act 60 were to reduce spending inequities and to provide property tax relief. Nevertheless, the justices of the Vermont Supreme Court made clear in

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[22]All of these regressions have been estimated in log-log form and with contemporaneous measures of per pupil equalized assessed value and adjusted gross income per exemption replacing the lagged measures used in Tables 4A, 4B, 5A, and 5B. The implications of the results that are generated from these alternative specifications are the same as those reported here.

their decision that in their view inequities in expenditures were likely to translate into inequities in outcome:

> While we recognize that equal dollar resources do not necessarily translate equally in effect, there is no reasonable doubt that substantial funding differences significantly affect opportunities to learn. To be sure, some school districts may manage their money better than others, and circumstances extraneous to the educational system may substantially affect a child's performance. Money is clearly not the only variable affecting educational opportunity, but it is one that government can effectively equalize. (page 9, *Brigham v. State* (96-502); 166 Vt. 246)

Thus, consideration must be given to how the distribution across districts of student performance changed after Act 60.

A crude indication of the impact of Act 60 on student performance is given by Table 2, which presents correlations in 1995-96 and 1999-2000 between some of the district characteristics summarized in Table 1. The correlations between student performance and all available measures of the resources allocated towards education have weakened in the post-Act 60 period. The starkest example of the weakening of these relationships is the decline from 1994-95 to 2000-2001 of the relationship between current expenditures per pupil and the percent of 4th graders at or above the standard for the concepts portion of the New Standards Reference Exam (NSRE) in Mathematics.[23] A more systematic assessment of the impact of Act 60 can be based on the results in Table 6, which give a few typical event-analysis regressions that are similar in flavor to those in Downes and Figlio (2000).[24]

Because they include controls for district-specific effects and because they are based on a functional form that explicitly accounts for the reality that the share of students meeting

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[23]Jimerson (2001) observes a similar decline in the correlation between equalized assessed value per pupil and the percent of 4th graders at or above the standard for the NSRE.

[24]Results for the performance of 2nd and 8th graders tend to mirror those in Tables 4 and 5. In no instance is there evidence that student performance has become less equal post-Act 60.

the standard must range between 0 and 1, regressions like those in Table 6 provide the most convincing estimates of the impact of Act 60. Further, because in these regressions the impact of Act 60 is allowed to vary with pre-Act 60 spending levels or pre-Act 60 property wealth, the regressions provide a direct indication of the extent to which the link between wealth and performance has changed post-Act 60. And, what is apparent from these regressions, and from a number of regressions in which other outcome measures are used as the dependent variable, is that there is some evidence that the gaps in performance between high spending and low spending districts and between high wealth and low wealth districts have, *ceteris paribus*, declined post-Act 60. In these regressions, the coefficient on the interaction between the Act 60 dummy and the pre-Act 60 spending or pre-Act 60 wealth is never positive and significant. And, as can be seen in Table 6, these coefficients are frequently negative and significant.

Care must be taken, however, not to make too much of the declines in inequality. The coefficients on the interactions are not consistently negative and significant. Further, when these coefficients are significant, they are quantitatively small. For example, the coefficient in the first column of Table 4 implies that, *ceteris paribus*, the difference between the shares of 4th graders at or above the standard for a school district with spending one standard deviation below the mean in 1994-95 and a school district with spending one standard deviation above the mean in 1994-95 would decline by 0.0021 if each district had the mean number of test-takers in 2000-2001. It seems unlikely that such small declines in dispersion in performance justify a major policy intervention like Act 60.

6. Concluding Remarks

Act 60 represents a dramatic change in the system of education financing in a state with a history of a demographically stable student population. As a result, Act 60 may well

provide an unparalleled opportunity to assess the impact of a significant finance reform on a state's education system. This paper represents a first cut at just such an assessment.

All of the evidence cited in this paper supports the conclusion that Act 60 has dramatically reduced dispersion in education spending and has done this by weakening the link between spending and property wealth. Further, the regressions presented in this paper offer some evidence that student performance has become more equal in the post-Act 60 period. And no results support the conclusion that Act 60 has contributed to increased dispersion in performance.

By themselves, these results may provide useful information for policy makers contemplating Act 60-style reforms. But the value of these results may well increase dramatically when taken together with the results of Duncombe and Johnston (2002) and of Flanagan and Murray (2002). What is striking is the similarity across studies in the estimated achievement effects. Pre-finance reform data on student test scores are not available to Duncombe and Johnston; they find no evidence of a diminishment in the dispersion in performance is apparent when examining post-finance reform test scores. They also document some recent relative improvement in dropout rates in high poverty districts, though they also find increased dispersion in dropout rates when comparing pre- and post-finance reform data.

The bottom line of Duncombe and Johnston's analysis of dropout rates is that reform has resulted in small relative improvements. Flanagan and Murray reach conclusions similar to those reached in this paper − post-reform dispersion in schooling outcomes has declined, but this decline in dispersion has been small. The results presented above indicate that, in Vermont, there have been, at most, small relative improvements in the test performance of fourth and eighth graders in those school districts with lower pre-reform per pupil spending

and per pupil property wealth. Flanagan and Murray find that relative increases in post-reform spending were translated into relative gains in post-reform test performance, but these gains were quantitatively small. Somewhat surprisingly, then, the results of these new case studies tend to echo the results of the earlier work on California. Thus far, the case studies have confirmed a conclusion that was reached by many of the researchers who executed national-level analyses; the types of finance reforms that have been implemented in response to court orders appear to have little, if any, impact on the distribution of student test performance.

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Table 1

Summary Statistics - Selected Characteristics of Vermont School Districts

Variable	Pre-Act 60								Post- Act 60					
	1994-95		1995-96		1996-97		1997-98		1998-99		1999-2000		2000-2001	
	Mean	Stan-dard Dev.	Mean	Stan-dard Dev.	Mean	Stan-dard Dev.	Mean	Stan-dard Dev.	Mean	Stan-dard Dev.	Mean	Stan-dard Dev.	Mean	Stan-dard Dev.
Current Exp. Per Pupil	5582.78	1546.03	5776.07	1502.84	5935.14	1012.70	6175.11	1105.13	6652.33	1294.00	7601.18	1330.29	8262.36	1491.91
Spec. Ed. Costs Per Elig. Pupil	1202.85	628.48	1294.49	710.64	1363.33	654.22	1503.53	710.10	1693.59	839.70	—	---	—	---
Students Per Classroom Teacher	17.96	11.34	17.53	3.87	17.28	3.28	16.86	3.04	16.57	3.56	15.70	2.97	15.09	2.91
Ave. Teacher Salary	32472.06	4249.53	33527.29	4520.34	33948.62	4495.41	---	---	34898.05	4889.94	35487.94	4857.72	36167.98	4821.56
Students Per Computer	---	---	---	---	14.16	11.86	8.04	4.65	7.35	4.84	6.76	4.44	---	---
Pct. Elig. for Free/Red.-Price Lunch	---	---	---	---	27.66	17.90	29.20	17.99	29.42	18.12	28.82	17.41	28.04	16.87
Poverty Rate	12.16	7.64	11.90	7.91	10.91	8.04	11.59	7.40	10.74	7.50	11.85	7.70	10.68	7.04
Avg. AGI per exempt (from tax returns)[1]	13581.38	2638.45	14220.30	2808.92	14894.31	3026.38	15829.26	3194.75	16913.95	3401.20	17743.62	3573.72	18610.63	3799.96
Pct. at/Above Stand. - Gr. 2 Reading	---	---	---	---	---	---	75.70	13.62	71.89	15.34	75.63	14.60	78.01	14.22
Pct. at/Above Stand. - Gr. 4 Math Conc.	---	---	17.41	14.62	---	---	32.47	19.10	37.94	17.88	38.14	18.84	42.05	18.99
Pct. at/Above Stand. - Gr. 4 Read.	---	---	---	---	58.17	17.89	79.19	13.22	86.12	11.00	83.04	12.70	79.30	13.23
Pct. at/Above Stand. - Gr. 8 Math Conc.	---	---	30.32	14.44	---	---	37.98	18.16	31.75	16.56	32.08	15.65	35.76	18.65
Pct. at/Above Stand. - Gr. 8 Read.	---	---	---	---	73.03	13.15	61.38	16.70	63.02	13.82	58.62	15.27	63.27	14.21

Note: 1) In 1997-98 and 1998-99, average adjusted gross income per exemption is available for all school districts (n=248). In the remaining years, average adjusted gross income per exemption is only available for those districts that correspond directly to towns (n=203).

Table 2

Correlations Between Selected Characteristics for Vermont School Districts, 1995-96

Variable	Current Expend. Per Pupil	Students Per Classroom Teacher	Ave. Teacher Salary	Poverty Rate	Avg. AGI per exemption (from tax returns)	Pct. of Adults with College Degree (1990)	Pct. at or Above Stand. - Gr. 4 Math Concepts	Pct. at or Above Stand. - Gr. 8 Math Concepts
Current Expend. Per Pupil	1.0000							
Students Per Classroom Teacher	-0.2011	1.0000						
Ave. Teacher Salary	0.2730	0.0023	1.0000					
Poverty Rate	-0.0945	-0.0373	-0.1780	1.0000				
Avg. AGI per exemption (from tax returns)	0.2313	0.1337	0.5196	-0.5571	1.0000			
Pct. of Adults with College Degree (1990)	0.1668	0.0813	0.3894	-0.5239	0.7964	1.0000		
Pct. at or Above Stand. - Gr. 4 Math Concepts	0.1355	0.1817	0.1618	-0.2317	0.2211	0.2779	1.0000	
Pct. at or Above Stand. - Gr. 8 Math Concepts	0.2058	0.0312	0.2371	-0.3380	0.3099	0.3741	0.1929	1.0000

Table 2 (cont.)
Correlations Between Selected Characteristics for Vermont School Districts, 2000-2001

Variable	Current Expend. Per Pupil	Students Per Classroom Teacher	Ave. Teacher Salary	Poverty Rate	Avg. AGI per exemption (from tax returns)	Pct. of Adults with College Degree (1990)	Pct. at or Above Stand. - Gr. 4 Math Concepts	Pct. at or Above Stand. - Gr. 8 Math Concepts
Current Expend. Per Pupil	1.0000							
Students Per Classroom Teacher	-0.3001	1.0000						
Ave. Teacher Salary	0.1822	0.3108	1.0000					
Poverty Rate	-0.0933	-0.1774	-0.2763	1.0000				
Avg. AGI per exemption (from tax returns)	0.1781	0.3482	0.5772	-0.6019	1.0000			
Pct. of Adults with College Degree (1990)	0.2464	0.2293	0.4617	-0.5707	0.8270	1.0000		
Pct. at or Above Stand. - Gr. 4 Math Concepts	0.0640	0.0792	0.1303	-0.3028	0.3278	0.3107	1.0000	
Pct. at or Above Stand. - Gr. 8 Math Concepts	0.2914	0.1394	0.1814	-0.3064	0.2986	0.3071	0.3257	1.0000

Table 3A

Relationships Between Expenditures and Wealth Measures for Vermont Towns
Dependent Variable: Budgeted Expenditures Per Equalized Pupil
(Robust Standard Errors in Parentheses)

Part 1

Variable	1998-99	2001-2002
Intercept	7099.495	9053.913
	(125.227)	(96.342)
Equalized Assessed Valuation per pupil	0.00093	0.00021
	(0.00027)	(0.00012)
R^2	0.266	0.019
Correlation coefficient	0.516	0.138

Part 2

Variable	1998-99	2001-2002
Intercept	5932.714	8204.978
	(357.866)	(403.246)
Median Family Income in 1989	0.04901	0.02973
	(0.01110)	(0.01160)
R^2	0.0873	0.0265
Correlation coefficient	0.295	0.163

Part 3

Variable	1998-99	2001-2002
Intercept	5781.257	8162.943
	(298.144)	(395.430)
Equalized Assessed Valuation per pupil	0.00088	0.00021
	(0.00024)	(0.00012)
Median Family Income	0.04102	0.02756
	(0.00910)	(0.01160)
R^2	0.326	0.0447
Correlation Coefficient	0.571	0.211

Table 3B

Relationships Between Expenditures and Wealth Measures for Vermont Towns
Dependent Variable: Local Expenditures Per Equalized Pupil
(Robust Standard Errors in Parentheses)

Part 1

Variable	2000-2001	2001-2002
Intercept	6980.417	7520.317
	(75.355)	(80.534)
Equalized Assessed Valuation per pupil	-0.00036	-0.00029
	(0.00011)	(0.00009)
R^2	0.0613	0.0459
Correlation Coefficient	0.248	0.214

Part 2

Variable	2000-2001	2001-2002
Intercept	5419.094	6328.920
	(303.555)	(350.287)
Median Family Income	0.04200	0.03087
	(0.00941)	(0.01068)
R^2	0.0862	0.0362
Correlation Coefficient	0.294	0.190

Part 3

Variable	2000-2001	2001-2002
Intercept	5477.803	6398.556
	(278.514)	(339.070)
Equalized Assessed Valuation per pupil	-0.00042	-0.00035
	(0.00015)	(0.00013)
Median Family Income	0.04658	0.03446
	(0.00848)	(0.01013)
R^2	0.172	0.100
Correlation Coefficient	0.415	0.316

Table 4A

Relationships Between Expenditures and Wealth Measures for Vermont K-12 Districts
Dependent Variable: Current Expenditures Per Equalized Pupil
(Robust Standard Errors in Parentheses)

Part 1

Variable	1997-98	2000-2001
Intercept	5551.390	7671.651
	(240.642)	(314.633)
Equalized Assessed Valuation per pupil in 1998	0.00208	0.00179
	(0.00065)	(0.00091)
R^2	0.200	0.120
Correlation coefficient	0.447	0.346

Part 2

Variable	1997-98	2000-2001
Intercept	4539.397	6690.965
	(779.732)	(733.089)
Adjusted Gross Income per Exemption in 1995	0.11919	0.11254
	(0.05448)	(0.04636)
R^2	0.155	0.109
Correlation coefficient	0.394	0.330

Part 3

Variable	1997-98	2000-2001
Intercept	5131.453	7113.170
	(933.787)	(933.681)
Equalized Assessed Valuation per pupil in 1998	0.00153	0.00109
	(0.00091)	(0.00130)
Adjusted Gross Income per Exemption in 1995	0.04390	0.05893
	(0.08008)	(0.08234)
R^2	0.219	0.135
Correlation Coefficient	0.468	0.367

Table 4B

Relationships Between Expenditures and Wealth Measures for Vermont K-12 Districts
Dependent Variable: Total Expenditures Per Equalized Pupil
(Robust Standard Errors in Parentheses)

Part 1

Variable	1997-1998	2000-2001
Intercept	6807.647	8886.544
	(478.282)	(444.865)
Equalized Assessed Valuation per pupil in 1998	0.00161	0.00133
	(0.00101)	(0.00110)
R^2	0.034	0.030
Correlation Coefficient	0.184	0.173

Part 2

Variable	1997-1998	2000-2001
Intercept	5464.105	7602.565
	(1577.796)	(840.889)
Adjusted Gross Income per Exemption in 1995	0.12711	0.11493
	(0.10495)	(0.05254)
R^2	0.048	0.049
Correlation Coefficient	0.219	0.221

Part 3

Variable	1997-1998	2000-2001
Intercept	5455.199	7702.238
	(1614.335)	(857.560)
Equalized Assessed Valuation per pupil in 1998	-0.00007	0.00078
	(0.00097)	(0.00125)
Adjusted Gross Income per Exemption in 1995	0.12948	0.08834
	(0.11663)	(0.05751)
R^2	0.048	0.059
Correlation Coefficient	0.219	0.243

Table 5A

Relationships Between Expenditures and Wealth Measures for Vermont Elementary Districts
Located in Towns That Do Not Tuition-Out High School Students
Dependent Variable: Current Expenditures Per Equalized Pupil
(Robust Standard Errors in Parentheses)

Part 1

Variable	1997-98	2000-2001
Intercept	5489.755	7333.604
	(175.307)	(256.968)
Equalized Assessed Valuation per pupil in 1998	0.00098	0.00145
	(0.00024)	(0.00042)
R^2	0.170	0.155
Correlation coefficient	0.412	0.394

Part 2

Variable	1997-98	2000-2001
Intercept	5116.117	7112.060
	(505.333)	(733.717)
Adjusted Gross Income per Exemption in 1995	0.07212	0.08422
	(0.03679)	(0.05340)
R^2	0.032	0.018
Correlation coefficient	0.179	0.134

Part 3

Variable	1997-98	2000-2001
Intercept	5187.736	7224.689
	(480.634)	(667.301)
Equalized Assessed Valuation per pupil in 1998	0.00088	0.00138
	(0.00024)	(0.00046)
Adjusted Gross Income per Exemption in 1995	0.02655	0.01255
	(0.03745)	(0.05353)
R^2	0.161	0.147
Correlation Coefficient	0.401	0.383

Table 5B

Relationships Between Expenditures and Wealth Measures for Vermont Elementary Districts
Located in Towns That Do Not Tuition-Out High School Students
Dependent Variable: Total Expenditures Per Equalized Pupil
(Robust Standard Errors in Parentheses)

Part 1

Variable	1997-1998	2000-2001
Intercept	6430.578	8294.678
	(231.805)	(318.056)
Equalized Assessed Valuation per pupil in 1998	0.00099	0.00156
	(0.00023)	(0.00047)
R^2	0.068	0.098
Correlation Coefficient	0.261	0.313

Part 2

Variable	1997-1998	2000-2001
Intercept	5635.405	7461.996
	(764.984)	(991.284)
Adjusted Gross Income per Exemption in 1995	0.10323	0.13541
	(0.05418)	(0.07123)
R^2	0.024	0.025
Correlation Coefficient	0.155	0.158

Part 3

Variable	1997-1998	2000-2001
Intercept	5707.972	7578.357
	(735.322)	(939.968)
Equalized Assessed Valuation per pupil in 1998	0.00089	0.00143
	(0.00026)	(0.00052)
Adjusted Gross Income per Exemption in 1995	0.05705	0.06137
	(0.05507)	(0.07464)
R^2	0.073	0.099
Correlation Coefficient	0.270	0.315

Table 6

GLM Estimates of Impact of Act 60 on Student Performance - Fixed Effects Estimates[1]
Dependent Variable: Number of Test-Takers at or above Standard in Mathematical Concepts
(Asymptotic Standard Errors Robust to Heteroskedasticity and Within Group Correlation in Parentheses)

Variable	**Fourth Graders**		**Eighth Graders**	
Variable	**Specification 1**	**Specification 2**	**Specification 1**	**Specification 2**
Dummy Variable Indicating Post-Act 60	-11.0842 (1.2278)	-11.4873 (1.2377)	-1.1104 (1.1417)	-0.7087 (1.1157)
Interaction of Post-Act 60 Dummy with Per Pupil Equalized Assessed Valuation - 1998	-----	0.0000001 (0.0000010)	-----	-0.0000013 (0.0000007)
Interaction of Post-Act 60 Dummy and Current Expend. Per Pupil - 1995	-0.00004 (0.00001)	-----	-0.00004 (0.00002)	-----
Poverty Rate	0.0166 (0.0153)	0.0204 (0.0157)	0.0232 (0.0193)	0.0305 (0.0199)
Adjusted Gross Income per Exemption	-0.00007 (0.00004)	-0.00007 (0.00005)	0.00005 (0.00004)	0.00003 (0.00004)
Dummy Variable Indicating 1995-96 School Year	-12.6610 (1.1588)	-12.7888 (1.1904)	-1.2845 (1.0080)	-0.7463 (0.9941)
Dummy Variable Indicating 1997-98 School Year	-11.6967 (1.1880)	-11.8655 (1.2138)	-1.0568 (1.0929)	-0.5050 (1.0742)
Dummy Variable Indicating 1999-2000 School Year	0.0289 (0.0615)	0.0132 (0.0651)	-0.0443 (0.0601)	-0.0309 (0.0584)
Dummy Variable Indicating 2000-2001 School Year	0.3159 (0.1005)	0.3062 (0.1073)	0.1145 (0.1002)	0.1751 (0.1035)
Log of Likelihood Function	-2474.6375	-2522.3365	-1541.9252	-1591.7884
Number of Observations	966	974	566	579

Note: 1) The constant is omitted from each specification. The omitted school year is 1998-1999.

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